Translation

PCT/DE2002/004522

PATENT COOPERATION TREATY

PCT

Patentanwaltskanzlei Kindermann

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

06. Sep. 2004

(PCT Article 36 and Rule 70)

Frist : .....

Applicant's or agent's file reference In1221WO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/DE2002/004522	International filing date (*day/month/year*) 10 December 2002 (10.12.2002)	Priority date (*day/month/year*) 15 January 2002 (15.01.2002)
International Patent Classification (IPC) or national classification and IPC H01L 29/792, 21/8246		
Applicant INFINEON TECHNOLOGIES AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
26 July 2003 (26.07.2003)	04 June 2004 (04.06.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/DE2002/004522

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-14, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages 2-15, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1, filed with the letter of 17 December 2003 (17.12.2003)

☒ the drawings:

pages 1-4, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	5-10	YES
	Claims	1-4, 11-15	NO
Inventive step (IS)	Claims		YES
	Claims	1-15	NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations

1. This report makes reference to the following documents:

D1: WO-A-0117030
D2: US-B1-6271090

2. D1 discloses (see figures 3A-3H and page 8, lines 4-21) a nonvolatile semiconductor memory cell having a substrate (P-Sub) that has a source region, a drain region and a channel region situated therebetween. A first insulating layer (gate oxide), an electrically non-conductive charge storage layer (Si_3N_3), a second insulating layer (SiO_2) and an electrically conductive control layer (poly 2 - figure 3H) are formed substantially on the surface of the channel region, the electrically non-conductive charge storage layer (Si_3N_3) having an interruption to form a first and a second storage region (see figure 3E).

The applicant is of the opinion that the subject matter of claim 1 differs from the memory cell known from D1 in that the first and second storage regions are **locally limited**, whereas the charge storage layer known from D1 is unlimited and extends across the

source/drain regions.

The words "locally limited" are not sufficient for making a distinction between the subject matter of claim 1 and the memory cell known from D1. D1 therefore also discloses a first and a second storage region, which are also **locally limited**.

The subject matter of claims 1 to 4 is therefore not novel (PCT Article 33(2)).

3. D2, which is regarded as the closest prior art, discloses (see figures 3-9) a method from which the subject matter of claim 5 differs substantially only in that the charge storage layer is electrically non-conductive.

This feature has, however, already been used for the same purpose in a similar method (see D1, in particular page 1, line 25 to page 2, line 2). If a person skilled in the art wished to fulfill the same purpose using a method according to D2, this person could readily apply this feature also to the subject matter of D2, thereby achieving a corresponding effect. In this manner, a person skilled in the art would arrive at a method according to claim 5, without thereby being inventive. The subject matter of claim 5 therefore does not involve an inventive step (PCT Article 33(3)).

The applicant argued that D2 relates to a fundamentally different type of nonvolatile semiconductor memory cell and therefore could not have suggested anything that would have led the applicant to the subject matter of the application.

This argument is not convincing, however, because the advantages achieved by the use of the nonconductive charge storage layer are already known from D1.

4. Dependent claims 6 to 15 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements with regard to novelty and inventive step. The reasons for this are as follows:

The subject matter of dependent claims 6 to 10 concerns minor modifications of the method according to claim 5 which are of the kind that a person skilled in the art routinely makes on the basis of familiar considerations, especially since the resulting advantages are readily foreseeable. The subject matter of claims 6 to 10 therefore does not involve an inventive step.

The features of dependent claims 11 to 15 are known from D1.